

WHAT IS CLAIMED IS:

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1. An image sensing method comprising:
the zooming step of performing zooming
operation;
- 5 the shutter speed control step of controlling a
timing of a charge storage time of an image sensing
element; and
- the control step of controlling to change a zoom
speed in the zooming step in accordance with a shutter
10 speed.
2. The method according to claim 1, wherein the
control step comprises controlling to decrease the
zoom speed in the zooming step when the shutter speed
is not more than a predetermined value.
- 15 3. An image sensing apparatus comprising:
zooming means for performing zooming operation;
shutter speed control means for controlling a
timing of a charge storage time of an image sensing
element; and
- 20 control means for controlling to change a zoom
speed of said zooming means in accordance with a
shutter speed.
4. The apparatus according to claim 3, wherein said
control means controls to decrease the zoom speed of
25 said zooming means when the shutter speed is not more
than a predetermined value.

5. An image sensing method comprising:
the zooming step of performing zooming operation
using a zoom lens;

the focus adjustment step of correcting movement
5 of a focal plane upon movement of said zoom lens by
using a focus lens;

the driving step of independently moving said zoom lens and said focus lens parallel to an optical axis;

10 the selection step of selecting a charge storage
time of an image sensing element;

the shutter speed control step of controlling a timing of the charge storage time of said image sensing element; and

15 the control step of controlling to change a zoom
speed in the zooming step in accordance with a shutter
speed.

6. The method according to claim 5, wherein the control step comprises controlling to decrease the zoom speed in the zooming step when the shutter speed is not more than a predetermined value.

7. An image sensing apparatus comprising:
zooming means for performing zooming operation
using a zoom lens;

25 focus adjustment means for correcting movement
of a focal plane upon movement of said zoom lens by

using a focus lens;

driving means for independently moving said zoom lens and said focus lens parallel to an optical axis;

an image sensing element;

5 selection means for selecting a charge storage time of said image sensing element;

shutter speed control means for controlling a timing of the charge storage time of said image sensing element; and

10 control means for controlling to change a zoom speed of said zooming means in accordance with a shutter speed.

8. The apparatus according to claim 7, wherein said control means controls to decrease the zoom speed of
15 said zooming means when the shutter speed is not more than a predetermined value.

9. A storage medium storing a control program for controlling an image sensing apparatus including zooming means for performing zooming operation,
20 shutter speed control means for controlling a timing of a charge storage time of an image sensing element, and control means for controlling a zoom speed of said zooming means, wherein the control program has a control module for the step of controlling to change
25 the zoom speed of said zooming means in accordance with a shutter speed.

10. The storage medium according to claim 9, wherein the control program has a control module for the control step of controlling to decrease the zoom speed of said zooming means when the shutter speed is not
5 more than a predetermined value.

11. A storage medium storing a control program for controlling an image sensing apparatus comprising zooming means for performing zooming operation using a zoom lens, focus adjustment means for correcting
10 movement of a focal plane upon movement of said zoom lens by using a focus lens, driving means for independently moving said zoom lens and said focus lens parallel to an optical axis, an image sensing element, selection means for selecting a charge
15 storage time of said image sensing element, shutter speed control means for controlling a timing of the charge storage time of said image sensing element, and control means for controlling a zoom speed of said zooming means, wherein the control program has a
20 control module for the step of controlling to change the zoom speed of said zooming means in accordance with a shutter speed.

12. The storage medium according to claim 11, wherein the control program has a control module for
25 the control step of controlling to decrease the zoom speed of said zooming means when the shutter speed is

not more than a predetermined value.

13. An image sensing apparatus having an arrangement which can maintain an in-focus state by correcting a displacement of a focal plane during zooming operation,
5 comprising:

signal detection means for extracting a high-frequency component from a video signal obtained by photographing an object, and detecting a sharpness signal;

10 zoom speed detection means for detecting a speed of the zooming operation; and

evaluation value calculation means for changing a time during which the sharpness signals are averaged, during the zooming operation, in accordance with the
15 speed of the zooming operation, and calculating a focus evaluation value during the zooming operation in the set averaging time.

14. The apparatus according to claim 13, wherein said evaluation value calculation means calculates the
20 focus evaluation value in accordance with the speed of the zooming operation by shortening the averaging time of the sharpness signals when the zoom speed is high, and prolonging the averaging time of the sharpness signals when the zoom speed is low.

25 15. The apparatus according to claim 13, wherein said evaluation value calculation means includes an

averaging time table set in correspondence with various zoom speeds, determines the various zoom speeds by referring to the averaging time, and calculates the focus evaluation value.

5 16. An image sensing apparatus having an arrangement which can maintain an in-focus state by correcting a displacement of a focal plane during zooming operation, comprising:

10 signal detection means for extracting a high-frequency component from a video signal obtained by photographing an object, and detecting a sharpness signal;

signal extraction means for extracting a
luminance signal from the video signal obtained by
15 photographing the object; and

evaluation value calculation means for changing
a time during which the sharpness signals are averaged,
during the zooming operation, in accordance with an
object illuminance obtained from the luminance signal,
20 and calculating a focus evaluation value during the
zooming operation in the set averaging time.

17. The apparatus according to claim 16, wherein
said evaluation value calculation means calculates the
focus evaluation value in accordance with the object
25 illuminance by shortening the averaging time of the
sharpness signals when the object illuminance is high.

and prolonging the averaging time of the sharpness signals when the object illuminance is low.

18. An image sensing apparatus having an arrangement which can maintain an in-focus state by correcting a displacement of a focal plane during zooming operation,
5 comprising:

signal detection means for extracting a high-frequency component from a video signal obtained by photographing an object, and detecting a sharpness
10 signal;

shake detection means for detecting a shake of said image sensing apparatus; and

evaluation value calculation means for changing a time during which the sharpness signals are averaged,
15 during the zooming operation, in accordance with information from said shake detection means, and calculating a focus evaluation value during the zooming operation in the set averaging time.

19. The apparatus according to claim 18, wherein
20 said evaluation value calculation means calculates the focus evaluation value by shortening the averaging time of the sharpness signals when no shake is detected by said shake detection means, and prolonging the averaging time of the sharpness signals when a
25 shake is detected.

20. An image sensing apparatus comprising:

a first lens group for zooming operation;

a second lens group for correcting movement of a focal plane during movement of said first lens group;

signal detection means for extracting a high-
5 frequency component from a video signal obtained by
photographing an object, and detecting a sharpness
signal;

zoom speed detection means for detecting a speed of the zooming operation;

10 storage means for storing information of a focus
position of said second lens group relative to a
position of said first lens group in correspondence
with an object distance;

moving speed calculation means for obtaining a
15 standard moving speed of said second lens group upon
movement of said first lens group on the basis of the
information stored in said storage means;

speed addition means for adding a correction speed to the standard moving speed of said second lens group, obtained by said moving speed calculation means, 20 during the zooming operation; and

focus control means for changing a time during which the sharpness signals are averaged, during the zooming operation, in accordance with the speed of the zooming operation, calculating a focus evaluation value during the zooming operation in the set

averaging time, and changing the correction speed to be added to the standard moving speed in accordance with a magnitude of the calculated focus evaluation value.

5 21. The apparatus according to claim 20, wherein said focus control means calculates the focus evaluation value in accordance with the speed of the zooming operation by shortening the averaging time of the sharpness signals when the zoom speed is high, and
10 prolonging the averaging time of the sharpness signals when the zoom speed is low.

22. The apparatus according to claim 20, wherein said focus control means includes an averaging time table set in correspondence with various zoom speeds,
15 determines the various zoom speeds by referring to the averaging time, and calculates the focus evaluation value.

23. An image sensing apparatus comprising:
a first lens group for zooming operation;
20 a second lens group for correcting movement of a focal plane during movement of said first lens group;
signal detection means for extracting a high-frequency component from a video signal obtained by photographing an object, and detecting a sharpness
25 signal;
signal extraction means for extracting a

luminance signal from the video signal obtained by photographing the object;

storage means for storing information of a focus position of said second lens group relative to a position of said first lens group in correspondence with an object distance;

moving speed calculation means for obtaining a standard moving speed of said second lens group upon movement of said first lens group on the basis of the information stored in said storage means;

speed addition means for adding a correction speed to the standard moving speed of said second lens group, obtained by said moving speed calculation means, during the zooming operation; and

focus control means for changing a time during which the sharpness signals are averaged, during the zooming operation, in accordance with an object illuminance obtained from the luminance signal, calculating a focus evaluation value during the zooming operation in the set averaging time, and changing the correction speed to be added to the standard moving speed in accordance with a magnitude of the calculated focus evaluation value.

24. The apparatus according to claim 23, wherein said focus control means calculates the focus evaluation value in accordance with the object

illuminance by shortening the averaging time of the sharpness signals when the object illuminance is high, and prolonging the averaging time of the sharpness signals when the object illuminance is low.

- 5 25. An image sensing apparatus comprising:
- a first lens group for zooming operation;
 - a second lens group for correcting movement of a focal plane during movement of said first lens group;
 - signal detection means for extracting a high-
 - 10 frequency component from a video signal obtained by photographing an object, and detecting a sharpness signal;
 - shake detection means for detecting a shake of said image sensing apparatus;
 - 15 storage means for storing information of a focus position of said second lens group relative to a position of said first lens group in correspondence with an object distance;
 - moving speed calculation means for obtaining a
 - 20 standard moving speed of said second lens group upon movement of said first lens group on the basis of the information stored in said storage means;
 - speed addition means for adding a correction speed to the standard moving speed of said second lens
 - 25 group, obtained by said moving speed calculation means, during the zooming operation; and

focus control means for changing a time during which the sharpness signals are averaged, during the zooming operation, in accordance with information from said shake detection means, calculating a focus

5 evaluation value during the zooming operation in the set averaging time, and changing the correction speed to be added to the standard moving speed in accordance with a magnitude of the calculated focus evaluation value.

10 26. The apparatus according to claim 25, wherein said focus control means calculates the focus evaluation value by shortening the averaging time of the sharpness signals when no shake is detected by said shake detection means, and prolonging the
15 averaging time of the sharpness signals when a shake is detected.

27. A lens control method used in an image sensing apparatus including a first lens group for zooming operation and a second lens group for correcting
20 movement of a focal plane during movement of said first lens group and adapted to control movement of said second lens group so as to maintain an in-focus state by correcting a displacement of a focal plane upon movement of said first lens group during zooming
25 operation, comprising the steps of:

averaging sharpness signals corresponding to a

predetermined time, each generated by extracting a high-frequency component from a video signal obtained by photographing an object, and calculating a focus evaluation value for determining a moving speed of said second lens group on the basis of the averaged sharpness signal; and

changing the averaging time of the sharpness signals during the zooming operation in accordance with a speed of the zooming operation.

28. A lens control method used in an image sensing apparatus including a first lens group for zooming operation and a second lens group for correcting movement of a focal plane during movement of said first lens group and adapted to control movement of said second lens group so as to maintain an in-focus state by correcting a displacement of a focal plane upon movement of said first lens group during zooming operation, comprising the steps of:

averaging sharpness signals corresponding to a predetermined time, each generated by extracting a high-frequency component from a video signal obtained by photographing an object, and calculating a focus evaluation value for determining a moving speed of said second lens group on the basis of the averaged sharpness signal; and

changing the averaging time of the sharpness

signals during the zooming operation in accordance with an object illuminance obtained from a luminance signal in the video signal obtained by photographing the object.

- 5 29. A lens control method used in an image sensing apparatus including a first lens group for zooming operation and a second lens group for correcting movement of a focal plane during movement of said first lens group and adapted to control movement of said second lens group so as to maintain an in-focus state by correcting a displacement of a focal plane upon movement of said first lens group during zooming operation, comprising the steps of:

- 15 averaging sharpness signals corresponding to a predetermined time, each generated by extracting a high-frequency component from a video signal obtained by photographing an object, and calculating a focus evaluation value for determining a moving speed of said second lens group on the basis of the averaged sharpness signal; and
- 20

changing the averaging time of the sharpness signals during the zooming operation in accordance with information from shake detection means for detecting a shake of said image sensing apparatus.